HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Long Fork	**LOCATION** @ Buckhorn cr. Rd
STATIONS 1 RIVERMILE	STREAM **CLASS**
LAT _____ LONG _____	RIVER BASM
STORET#	AGENCY
INVESTIGATORS LD JM, JA SW	
FORM COMPLETED **BY** LD	**TIME** _____ CM (PM) REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than **70%** of substrate favorable for epifaunal colonization and fish cover; mix of **snags.** submerged **logs.** undercut banks, cobble or other stable habitat **and** at stage to allow full colonization potential (i.e., logs/snags that are ~~not~~ new fall **and** transient).	40-70% mix of stable habitat; well-suited for ~~full colonization~~ potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, **but** *not* yet prepared for colonization (may rare at high end of scale).	20-40% mix of stable habitat; habitat availability less than ~~desirable; substrate~~ frequently disturbed or removed.	Less than 20% stable habitat: lack of habitat is obvious; substrate unstable or lacking.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	**Gravel,** cobble, **and** boulder panicles are 0-***25%*** surrounded by tine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE 18	20 19. (18) 17 16	15 14 13 12. 11.	10 9 8 7 6	5 4. 3 2 1 0
3. Velocity/Depth Regime	**All** iaur velocity/depth regimes present (slow-deep. slow-shallow, fast. deep, fast-shallow). (Slow **is** < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow i r nissing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE 17	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or **no** enlargement of islands or **point bars and** less than ***5%*** of the bottom aifected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate oeposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently: pools almost absent due to substantial sediment deposition.
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower **banks,** and minimal amount of channel substrate **is** exposed.	Water fills >75% of the available channel: or <25% *of* channel substrate **is** exposed.	Water Ells 25-75% of the available channel. and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as **standing** pools.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

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Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal		Poor
. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 1 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25
SCORE 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 8 (LB)	Left Bank 10 (9)	(8) 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

Total Score 173

STREAM NAME Long Fork	LOCATION @ Buckhorn cr Rd
STATION # 1 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGMCY
INVESTIGATORS LD, JM, JA, SW	
FORM COMPLETED BY LD	DATE 5-2-00 AM (PM) / REASON FOR SURVEY

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

photo #3 up
photo #4 down

HABITAT TYPES

Indicate the percentage of each habitat type present

☑ Cobble 70 % ☑ Snags 10 % ☐ Undercut Banks 10 % ☑ Sand 5 %

☐ Submerged Macrophytes ____ % ☐ Other (CPOM) 5 % LD

STREAM CHARACTERIZATION

Subsystem Classification ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type ☐ Coldwater ☑ Warmwater

S

Predominant Surrounding Landuse
☒ Forest ☐ Commercial
☐ Field/Pasture ☒ Industrial
☐ Agricultural ☐ Other_____
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☒ Some potential sources
☐ Obvious sources

Canopy Cover
☒ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark 1 m

Local Water Erosion
☐ None ☒ Moderate ☐ Heavy

Estimated Stream Width 6 m

Estimated Stream Depth
☐ Riffle .2 m ☒ Run .5 m
☒ Pool 1.7 m

Velocity 1.3 m/sec 4/1/50 C

Estimated Reach Length 100 m

Channelized ☐ Yes ☒ No

Dam Present ☐ Yes ☒ No

ION

Indicate the dominant type and record the dominant species present
☒ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present iron wood, Sycamore, Hackberry

ON

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover 0 %

SEDIMENT/ SUBSTRATE

Odors
☒ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other_____

Oils
☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other_____

Looking at stones which are not deeply embedded, are the undersides black in color?
☒ Yes ☐ No

WATER QUALITY

Temperature_____ ° C

Specific Conductance_____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☒ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other_____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☐ None ☐ Other_____

Turbidity (if not measured)
☒ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")	20	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	75			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

PHYSICAL CHARACTERISTICS

STREAM NAME Grapevine Ck	LOCATION above Clear Fork ~ 700'
STATION # 2 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / CGDW
INVESTIGATORS	
FORM COMPLETED BY Howard	DATE 5/4/02 ~~0845~~ (AM) PM
	REASON FOR SURVEY MTM/UF

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

PIX 25, 26, 27

HABITAT TYPES

Indicate the percentage of each habitat type present

~~Cobble~~ ____% ☐ Snags ____% ☐ Undercut Banks ____% ☐ Sand ____%

☐ Submerged Macrophytes ____% ☐ Other ( ) ____%

STREAM CHARACTERIZATIO

~~Subsystem~~ Classification ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type ☐ Coldwater ☑ Warmwater

* Water too deep & current too swift to conduct RBP.

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☐ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☐ Other major hwy (29) Megaphone
~~☑ Residential~~

Local Watershed NPS Pollution
☐ No evidence ☐ Some potential sources
~~☑ Obvious sources~~

Canopy Cover
~~☑ Partly open~~ ☐ Partly shaded ☐ Shaded

High Water Mark 1' m

Local Water Erosion
☐ None ~~☑ Moderate~~ ☐ Heavy

Estimated Stream Width 12' m

Estimated Stream Depth
☐ Riffle 10" m ☐ Run 1' m
☐ Pool ____ m

Velocity 2.5 ~~m/sec~~ ft/sec

Estimated Reach Length ____ m

Channelized ☐ Yes ☐ No

Dam Present ☐ Yes ☐ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
~~☑ Trees~~ ☐ *Shrubs* ☐ Grasses ☐ Herbaceous

dominant species present _____

AQUATIC VEGETATION

N/A

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover ____ %

SEDIMENT/ SUBSTRATE

Odors
~~☑ Normal~~ ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☐ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ~~☑ Sand~~
☐ Relict shells ☐ Other _____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☐ No

WATER QUALITY

Temperature 14.73 C

Specific Conductance 363

Dissolved Oxygen 9.12

pH 7.75

Turbidity _____

WQ Instrument Used Hydrolab

Water Odors
~~☑ Normal/None~~ ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
~~☑ None~~ ☐ Other _____

Turbidity (if not measured)
☐ Clear ☐ Slightly turbid ~~☑ Turbid~~
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, course plant materials (CPOM)	
Boulder	> 256 mm (10")	30			
Cobble	64-256 mm (2.5"-10")	40	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	10			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	
Silt	0.004-0.06 mm	10			
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Buffalo Creek	LOCATION off Hwy 1096 just east of Hwy 15 bridge
STATION# 3 RIVERMILE	STREAM **CLASS**
LAT **LONG**	RIVER **BASM**
STORET #	**AGENCY**
mands	
FORM COMPLETED ***BY*** J. Mandsley	DATE 5/3/00 TIME 1500 AM (PM) **REASON** FOR **SURVEY**

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable **for** epifaunal colonization and fish cover; mix of snags, *submerged* **logs.** undercut banks. cobble or other stable habitat and **at** stage to **allow** full colonization potential (*i.e., logs/snags that are* new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations: presence of additional substrate in the form of newfall, bur not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat: habitat **availability** less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; **lack** of habitat is obvious: substrate unstable or lacking.
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder pamcles are 0-25% surrounded by fine	**Gravel,** cobble, and boulder particles are 25-50% surrounded by fine	Grovel, cobble, and boulder particles are SO-*75%* surrounded by fine sediment.	Gravel, cobble, and boulder **particles** are more than **75%** surrounded by fine **sediment.**
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth **regimes** present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	**Only** 3 of the **4** regimes present (if fast-shallow is missing, score lower rhnn **if** missing other regimes).	Only 2 of the **4** habitat *regimes present* (if fast-shallow or slow-shallow are missing, score low).	Dominated **by** 1 *velocity/* **depth** regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	(10) 9 8 7 6	5 4 3 2 1 0
4. Sediment Reposition	Little or no enlargement of islands or point bars and less than **5%** of the bottom affected by sediment deposition.	Some new increase in bar formation. mostly *from gravel,* sand or fine sediment; 5-30% *of* the bottom affected: slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, **and** minimal amount of channel substrate **is** exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills *25-75%* of the available channel. and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

Parameters to be evaluated in sampling reach

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
6. Channel **alteration**	Channelization or dredging absent or minimal: stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, bur recent channelization is not present.	Channelization may be extensive; embankments or shoring structures **present** on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cemenr: over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. **Frequency** of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance beween **riffles** divided by width oirhe stream <7:1 **(generally 5 to 7);** variety of habitat **is** key. In streams whcrc riffles are continuous. placement of boulders or orhcr large. natural **obstruction** is important.	Occurrence of riffles infrequent; distance beween nffles dividcd by the width of the stream is between 7 to 15.	Occasional riffle or end: bottom contours rovide some habitat; istance between nfflrs ividcd by the width oi	Generally ail **flat** water or shallow riffles; poor habitat; distance between riffles divided **by** rhe width o i the stream is a
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately **stable; infrcquent,** small areas of crosion mostly healed over. 5-30% oibank in reach has areas of erosion.	Moderately unstable; 30-60% afbank in reach has areas of erosion; high erosion potential during **floods.**	Unstable: many eroded areas; **"raw"** areas frequent along straight sections and bends: obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate **riparian** zone covered **by** native vegetation, including trees, understory **shrubs,** or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank suriacer covered by native vegetation, but one class of plants is not well-represented; disruption evident **bur** nor affecting full plant growth potential to any great exrenr: more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces tovered by vegetanon; disruption obvious; **patches** oibare soil or **closely** cropped vegetation common; less rhan one-half of the potential plant stubble heighr remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative **Zone** Width (score each bank riparian zone)	Widrh of **riparian** zone >18 meters; **human** acrivities (i.e., parking lots, **roadbeds,** clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	**Width** of **riparian** zone **6-12** meters; human activities have impacted zonc a great deal.	Width of riparian zone <6 meters: little or *no* **riparian** vegetation due **to** human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	3	2 1 0.
SCORE ___ (RB)	Right Bank 10 9	8 7 6		

~ o r a $core 166

PHYSICAL CHARACTERIZATION

STREAM NAME Buffalo Creek	LOCATION g/b 1096 just east of Hwy 15 bridge
STATION # 3 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS Dorn / Maudsley / Ackerman / RW	
FORM COMPLETED BY J. Maudsley	DATE 5/3/00 AM (PM)
	REASON FOR SURVEY

SITE LOUTIONMAP

Draw a map of the site and indicate the areas sampled

photo 14 (upstream)
photo 15 (downstream)

HABITAT TYPES

Indicate the percentage of each habitat type present

☒ Cobble 90 % ☐ Snags 5 % ☐ Undercut Banks 0 % ☐ Sand 0 %

☐ Submerged Macrophytes ____ % ☐ Other (CPOM) 5 %

STREAM CHARACTERIZATION

Subsystem Classification
☒ Perennial ☐ Intermittent ☐ Tidal

Stream Type
☐ Coldwater ☒ Warmwater

3.2
4.5
6.5
7.5
9.0
10.5 9

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☒ Forest ☒ Commercial
☒ Field/Pasture ☒ Industrial
☐ Agricultural ☐ Other_____
☒ Residential

Local Watershed NPS Pollution
☐ No evidence ☒ Some potential sources
☒ Obvious sources (road/mining)

Canopy Cover
☐ Partly open ☒ Partly shaded ☐ Shaded

High Water Mark 1.5 m

Local Water Erosion
☐ None ☒ Moderate ☐ Heavy

Estimated Stream Width 4 m

Estimated Stream Depth
☐ Riffle .2 m ☐ Run .2 m
☐ Pool .3 m

Velocity 1.5 ft/sec

Estimated Reach Length 100 m

Channelized ☒ Yes ☐ No

Dam Present ☐ Yes ☒ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the *dominant species present*
☐ Trees ☒ Shrubs ☒ Grasses ☐ Herbaceous

dominant species present exotics

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ *Rooted emergent* ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☒ Attached Algae

dominant species present bluegreens / diatoms

Portion of the reach with vegetative cover 75 %

SEDIMENT/ SUBSTRATE

Odors
☒ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other_____

Oils
☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other none

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☒ No

WATER QUALITY

Temperature_____ ° C

Specific Conductance_____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☐ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other_____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☐ None ☐ Other_____

Turbidity (if not measured)
☐ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")	15			
Cobble	64–256 mm (2.5"-10")	45	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	40			
Sand	0.06-2mm (gritty)		Marl	grey, shell fragments	
Silt	0.004–0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Laurel Fork	LOCATION @ Upper Laurel Fork Rd
STATION # 4 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA
INVESTIGATORS	
FORM COMPLETED BY Howard / Welda	DATE 5/31/00 TIME 0915 (AM) PM
REASON FOR SURVEY Ky ATM / UF	

ers to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or licking.
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 15% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
				5 (5) 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 (3) 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
5. Channel Alteration	Channelization or dredging absent or minimal: stream with normal pattern.	Some channelization present. usuaiiy in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and . . disrupted.	Banks shored with gabion or cement; over 30% of the stream reach channelized and disrupted. insrrenm habitat greatly altered or removed entirely.
SCORE		1 0 9	3 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width a i rhc stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	)ccurrence of riffles nfrequent; distance etween riffles divided y the width of the tream is between 7 to 5.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by the widrh of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles dividcd by the width of the stream is a ratio of >25.
SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable: evidence of erosion or bank failure absent or minimal: little potential for future problems. <5% of bank affected.	Moderately stable; nfrequenr. small areas of erosion mostly healed over. 5-30% of bank in each has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	(8) 7 6	5 4	2 1 0
SCORE ___ (RB)	Right Bank 10 9	a 7 (6)	5 3 3	2 1 0
9. Vegetative Prorecrion (score each bank)	Mare than 90% of rhe streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs. or nonwoody macrophyres; vegetative disruption through grazing or mowing minimal or not cvidenr: almost all pians allowed to grow naturally.	70–90% of the streambank surfaces covered by native vegetation, bur one clas of plants is not well-rcpresenced: disruption evident but nor affectin full pianr growth potential to any great extent: more than one-half of the potential plant stubble height remaining.	50–70% o i the streambank surfaces covered by vegetation; disruption obvious: patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption o istreambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 (9)			
SCORE ___ (RB)	Right Bank 10 9	8 7 (6)	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

Total Score 128

PHYSICAL CHARACTERIZATION

STREAM NAME Laurel Fork	LOCATION @ Upper Laurel Fork Rd.
STATION # RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA
INVESTIGATORS Howard Welch	
FORM COMPLETED BY Howard Welch	DATE 5/3/00 0715 AM PM
REASON FOR SURVEY KY MTN/VF	

TE LOCATION/MAP	Draw a map of the site and indicate the areas sampled Pix # 14, 15, 16
HABITAT TYPES	Indicate the percentage of each habitat type present ❑ Cobble____% ❑ Snags____% ❑ Undercut Banks____% ❑ Sand____% ❑ Submerged Macrophytes____% ❑ Other ( )____%
STREAM CHARACTERIZATION	Subsystem Classification ❑ Perennial ❑ Intermittent ❑ Tidal Stream Type ❑ Coldwater ❑ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☒ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☐ Other _____
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☒ Some potential sources
☐ Obvious sources

Canopy Cover
☐ Partly open ☒ Partly-shaded ☐ Shaded

High Water Mark 2 ft/in

Local Water Erosion
☒ None ☐ Moderate ☐ Heavy

Estimated Stream Width 11 m ft

Estimated Stream Depth
☐ Riffle 8-10" m ☐ Run 10" m
☐ Pool ___ m

Velocity 1.67 m/sec ft/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☒ No

Dam Present ☐ Yes ☒ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☒ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present beech, ironwood, maples, dogwood

AQUATIC VEGETATION

N/A

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover ____%

SEDIMENT/ SUBSTRATE

Odors
☒ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☒ Sand
☐ Relict shells ☐ Other coal fines

Looking at stones which are not deeply embedded, are the undersides black in color?
☒ Yes ☐ No

WATER QUALITY

Temperature 13.66° C

Specific Conductance 1550

Dissolved Oxygen 9.54

pH 7.64

Turbidity _____

WQ Instrument Used Hydrolab

Water Odors
☐ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☐ None ☐ Other _____

Turbidity (if not measured)
☐ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	20
Cobble	64-256 mm (2.5"-10")	40
Gravel	2-64 mm (0.1"-2.5")	20
Sand	0.06-2mm (gritty)	20 10 silt
Silt	0.004-0.06 mm	10
Clay	< 0.004 mm (slick)	

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	15
Muck-Mud	black, very fine organic (FPOM)	10 coal fines
Marl	grey, shell fragments	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Fugate Fork	LOCATION Fugate Fork Rd
STATION # 5 RIVERMILE	STREAM CLASS
LAT ____ LONG ____	RIVER BASIN
STORET #	AGENCY EPA/KDOW
INVESTIGATORS Howard/Weldon/Call	
FORM COMPLETED BY Howard et al	DATE 5/2/00 TIME 1305 AM PM (circled)
REASON FOR SURVEY Ky MTM/VF	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and	Gravel, cobble. and	Gravel, cobble, and	Gravel, cobble, and
SCORE				
3. Velocity/Depth Regime	deep, slow-shallow, deep, fast-shallow). (Slow is < 0.5 m/s, deep is > 0.5 m.)	regimes).		
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 (6)	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 4 3 2 1 0

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream wirh normal pattern.	Some channelization present. usually in areas oibridge abutments; cvidenca of past channelization, i.e., dredging, (greater rhan past 20 yr) may be present. but recent channelization is not present.	Channelization may bc extensive; embankments or shoring structures present an both banks; and 40 to 80% of stream reach channelized and disrupted.	Ranks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 (18) / 17 16 / 15 **14** 13 12 11	10 9 **8** 7 6	5 4 3 **2** 1 0	
7. Frequency of Rimes (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width f rhe stream <7:1 generally 5 to 7); ariety of habitat is key. 7 streams where riffles re continuous. lacement of boulders or ther large, natural bstruction is important.	Occurrence of riffles infrequent; distance berween riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance berween riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank hilure absent or *minimal; little potential* or future problems. <5% of bank affected.	Moderately stable: nfrequent, small areas *oi* rosion mostly healed over. 5-30% oibank in each has areas of rosion.	Moderately unstable; 30-60% oibank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas irequent along straight sections and bends; obvious bank sloughing: 60-100% of bank has erosional scars.
SCORE ___ (RB)	*Left Bank* 10 **9**	8 (7) 6	**5** 4 3	**2** 1 0
SCORE ___ (RB)	Right Bank 10 (9)			
9. Vegetative Prorecrion (score each bank)	More than 90% of the streambank *surfaces* and immediate riparian zone covered by native vegetation, including trees, understory shrubs. or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost ail plants allowed to grow naturally.	70-90% of the *streambank surfaces* covcrcd by native vegetation, but one class of plants is not well-represented; disruption potenrial to any great extent; more rhan one. half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; parches of bare soil or closely cropped potential plant stubble height remaining.	**Less** than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	
SCORE ___ (RB)	Right Bank 10 (9)			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Widrh of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts. lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
SCORE ___ (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0

Total Score 138

STREAM NAME Fugate Fork	LOCATION Fugate Fork Rd
STATION # 5 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / KY DOW
INVESTIGATORS Howard/Welton	
FORM COMPLETED BY Howard/Welton	DATE 5/2/00 1305 AM (PM) REASON FOR SURVEY MTM/VF - Ky

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

pix 7, 8

HABITAT TYPES

Indicate the percentage of each habitat type present

☑ Cobble____% ☑ Snags____% ☑ Undercut Banks____% ☐ Sand____%

☐ Submerged Macrophytes____% ☑ Other (CPOM)____%

STREAM CHARACTERIZATION

Subsystem Classification ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type ☐ Coldwater ☑ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☐ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☒ Agricultural ☐ Other road / left bank
☐ Residential → garden / pasture

Local Watershed NPS Pollution
☐ No evidence ☐ Some potential sources
☐ Obvious sources

Canopy Cover
☒ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark 2' ft

Local Water Erosion
☐ None ☒ Moderate ☐ Heavy

Estimated Stream Width 8 ft

Estimated Stream Depth
☐ Riffle 6-10" ☐ Run 1 ft
☐ Pool 1-2 ft

Velocity .77 ft/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☒ No

Dam Present ☐ Yes ☒ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the *dominant species present*
☒ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present _____

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☒ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover ____%

SEDIMENT/ SUBSTRATE

Odors
☒ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☒ Sand
☐ Relict shells ☒ Other silt

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☐ No

WATER QUALITY

Temperature 15 °C
Specific Conductance 836
Dissolved Oxygen 9.58
pH 7.19
Turbidity _____
WQ Instrument Used Hydrolab

Water Odors
☒ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☒ None ☐ Other _____

Turbidity (if not measured)
☒ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	15
Cobble	64-256 mm (2.5"-10")	40
Gravel	2-64 mm (0.1"-2.5")	15
Sand	0.06-2mm (gritty)	30
Silt	0.004-0.06 mm	5
Clay	< 0.004 mm (slick)	

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	20
Muck-Mud	black, very fine organic (FPOM)	
Marl	grey, shell fragments	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Sims Fork	LOCATION @ Sims Fork Rd
STATION # 6 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / Ky Dow
INVESTIGATORS	
FORM COMPLETED BY Howard Wilder	DATE 5/31/00 TIME 1500 AM PM
	REASON FOR SURVEY Ky MTM/VF

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder **panicles** are 0-**25%** surrounded by fine sediment. Layering of cobble provides diversity of niche **space.**	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sedimcnt.	Gravel, cobble, and boulder particles are 50-75% surrounded by tine sedimcnt.	Gravel, cobble, **and** boulder particles are more than **75%** surrounded by tine sediment.
SCORE	20 19 18 17 16	15 14 (13) 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	**All** four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, (fast-shallow)) (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes presenr (if fast-shallow is **missing,** score lower than if missing other rcgirnes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ deprh regime (usually slow-deep).
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 7 6	(5) 4 3 2 1 0
4. Sediment **Deposition**	Little or **no** enlargement and less than **5%** of the bottom affected by sediment deposition.	Some new increase in from gravel, sand or fine sedimcnt: 5-30% of the bottom affected: slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars: 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; **pools** almost absent due to substantial sediment deposition
SCORE	20 19 18 17 16	15 14 13 12 (11)	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may bc presenr. but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% af stream reach channelized and disrupted.	Banks shored with gabion or cement: over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or remove: entirely.
	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance beween riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or cithcr large, natural obstruction is important.	Occurrence of riffles infrequent; disrancc beween riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 1 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrcqucnt. small a r e s o i erosion mostly healed over. 5-30% uibank in reach has areas o i erosion.	Moderately unstable; 30-60% of bank in reach has areas oierosion: high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 (9)	8 7 6	5 a 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zonc covered by narivc vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or nor evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by nanve vegetation, but one class of plants is not well-represented: disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation: disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-hnlfaf the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of sueambank vegetation is very high: vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not Impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zonc oniy minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Widrh of riparian zone <6 meters: little or no riparian vegetation due to humm activities.
SCORE ___ (LB)	Left Bank 10. (9)	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 (7) 6	5 5 3	2 1 0

1 run ers to be evaluated broader than sampling reach

Total Score 144

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Sims Fork	LOCATION @ Sims Fork Rd bridge
STATION # 6e RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / Cty Dow
INVESTIGATORS Howard/Weldon/Cael	
FORM COMPLETED BY Howard / Weldon	DATE AM PM
	REASON FOR SURVEY MTM / UE

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

Pix 19 – upstream midpt
Pix 20 downstream midpt

HABITAT TYPES

Indicate the percentage of each habitat type present.

☑ Cobble 60 % ☐ Snags ____ % ☐ Undercut Banks ____ % ☑ Sand ____ %

☐ Submerged Macrophytes ____ % ☐ Other ( ) ____ %

STREAM CHARACTERIZATION

Subsystem Classification ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type ☐ Coldwater ☑ Warmwater

S	**Predominant Surrounding Landuse** ☐ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☒ Other rd along rt bank ☐ Residential **Local Watershed NPS Pollution** ☐ No evidence ☐ Some potential sources ☒ Obvious sources **Canopy Cover** ☐ Partly open ☒ Partly shaded ☐ Shaded **High Water Mark** 1 ft **Local Water Erosion** * logging off left bank ☐ None ☐ Moderate ☐ Heavy **Estimated Stream Width** 20 ft. **Estimated Stream Depth** ☐ Riffle 6-10" m ☐ Run 1' m ☐ Pool ____ m **Velocity** 1.25 m/sec **Estimated Reach Length** 100 m **Channelized** ☐ Yes ☐ No **Dam Present** ☐ Yes ☐ No
RIPARIAN VEGETATION (18 meter buffer)	**Indicate the dominant type and record the dominant species present** ☐ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous **dominant species present** _____
AQUATIC VEGETATION N/A	**Indicate the dominant type and record the dominant species present** ☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating Algae ☐ Attached Algae **dominant species present** _____ **Portion of the reach with vegetative cover** ____%
SEDIMENT/ SUBSTRATE	**Odors** ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☐ None ☐ Other _____ **Oils** ☐ Absent ☐ Slight ☐ Moderate ☐ Profuse **Deposits** ☐ Sludge ☐ Sawdust ☐ Paper fiber ☒ Sand ☐ Relict shells ☐ Other _____ **Looking at stones which are not deeply embedded, are the undersides black in color?** ☐ Yes ☒ No
WATER QUALITY	**Temperature** 18.57 C **Specific Conductance** 420 **Dissolved Oxygen** 8.52 **pH** 8.14 **Turbidity** _____ **WQ Instrument Used** Hydrolab **Water Odors** ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other _____ **Water Surface Oils** ☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☒ None ☐ Other _____ **Turbidity (if not measured)** ☐ Clear ☐ Slightly turbid ☒ Turbid ☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	10
Boulder	> 256 mm (10")	30			
Cobble	64-256 mm (2.5"-10")	30	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	15			
Sand	0.06-2mm (gritty)	15	Marl	grey, shell fragments	
Silt	0.004-0.06 mm	10			
Clay	< 0.004 mm (slick)				

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Spring Fk / Quicksand	LOCATION nr confluence with Hughes Ck
STATION # 7 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / KY DOW
INVESTIGATORS Howard / Welch / Call	
FORM COMPLETED BY Howard Welch	DATE 5/2/00 TIME 1020 AM PM
REASON FOR SURVEY MTM/UF	

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Grenrer than 70% of substrate favorable for epifaunal colonization and fish cover: mix of snag. submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations: presence of additional substrate in the form of newfall, bur not yet prepared for colonization (may rare at high end of scale).	20-40% mix of stable habitat; habirnr availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking
SCORE	20 19 18 17 16	15 14/19 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 17 16	15 14 13 12. (11)	10 9 8. 7'. 6.	5.' 4 3. 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 rcgimcs present (if fast-shallow is missing, score Iowcr than if missing other regimes).	Only 2 of the 4 habitat rcgimcs present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slowdeep).
SCORE	20 19 18 17 1	15 14 13 12 11	10 (9) 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% afrhe bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bortom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected: sediment deposits at obstructions, constrictions, and bends: moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar dcveiopmenr: more than 50% of the bortom changing frequently; pools almost abscnr due to substannial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 (8) 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base o i both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel: or <25% of channel subserare is exposed.	Water rills 25-75% of the available chmncl, and/or riffle substrates are mostly cxposcd.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present. usually in areas of bridge abutments; evidence oipast channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks: and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively irequent: ratio of disrancc between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles arc continuous, placement of boulders or other large. natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width oi the Stream is between 15 to 25.	Generally all flat warer or shallow riffles; poor habitat; disrancc between rifflcs divided by the width of the stream is a ratio of >25.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 3 3 2 1 0
. Bank Stability score each bank) Note: determine left ir right side by acing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequenr. small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% ofbank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends: obvious bank sloughing: 60-100% oi bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	8 (7) 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% oithe streambank surfaces covered by vegetation; disruption obvious; parches oibare soil or closely cropped vegetation common; less thin one-half of the potential plant stubble height remaining.	Less rhan 50% of the streambank surfaces covered by vegetation; disruption o istreambank vegetation is v e y high: vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 7 (6)	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each Sank riparian zone)	Width oiriparian zone >18 meters; human activities ..e., parking lots, roadbeas, ::m-CUB. lawns, or crops) have nor impacred zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacred zone a grear deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 7 6	5 4 3	(2) 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0

Total Score 131

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Spring Fk/Quicksand	LOCATION @ Confl. with Hughes Ck	
STATION # 7 RIVERMILE	STREAM CLASS	
LAT LONG	RIVER BASIN	
STORET #	AGENCY EPA / KYDOW	
INVESTIGATORS Howard/Wellon/Call		
FORM COMPLETED BY Howard/Wellon	DATE 5/24/00 1000 AM PM	REASON FOR SURVEY MTM/VF

SITE LOCATION/MAP	**Draw a map of the site and indicate the areas sampled** Pix 2, 3
HABITAT TYPES	**Indicate the percentage of each habitat type present** ☐ Cobble____% ☐ Snags____% ☐ Undercut Banks____% ☐ Sand____% ☐ Submerged Macrophytes____% ☐ Other ( )____%
STREAM CHARACTERIZATION	**Subsystem Classification** ☒ Perennial ☐ Intermittent ☐ Tidal **Stream Type** ☐ Coldwater ☒ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☐ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☐ Other road/RR either side
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☐ Some potential sources
☑ Obvious sources

Canopy Cover
☑ Partly open ☐ Partly-shaded ☐ Shaded

High Water Mark ~1 m

Local Water Erosion
☐ None ☑ Moderate ☐ Heavy

Estimated Stream Width 15 m ft

Estimated Stream Depth
☐ Riffle 0.5 m ft ☐ Run 1 m ft
☐ Pool ____ m

Velocity 2.5 m/sec ft/sec

Estimated Reach Length 1022 m

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present _____

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover ____ %

SEDIMENT/ SUBSTRATE

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other _____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☐ No

WATER QUALITY

Temperature 15.01 °C

Specific Conductance 480

Dissolved Oxygen 9.17

pH 7.15

Turbidity _____

WQ Instrument Used Hydrolab

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☑ None ☐ Other _____

Turbidity (if not measured)
☐ Clear ☑ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	
Cobble	64-256 mm (2.5"-10")	50
Gravel	2-64 mm (0.1"-2.5")	10
Sand	0.06-2mm (gritty)	30
Silt	0.004-0.06 mm	10
Clay	< 0.004 mm (slick)	

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	10
Muck-Mud	black, very fine organic (FPOM) (coal tar)	10
Marl	grey, shell fragments	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAM NAME Lost creek	LOCATION @ 1446
STATION # 9 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS LD JM, JA, SG	
FORM COMPLETED BY LD	DATE 5-2-00 TIME 1530 AM (PM) REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations: presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious: substrate unstable or lacking.
(SCORE 17)	20 19 18 (17) 16	15 14 13 12 11	in 9 8 7 6	4 3 2 1 0
2. Embeddedness	Gravel. cobble, and boulder particles arc 0-25% surrounded by tine sediment. Layering of cobble provides diversity of niche space.	Gravel. cobble. and boulder particles arc 25-50% surrounded by tine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by tine Sediment.	Gravel, cobbie, and boulder particles are more than 15% surrounded by fine sediment.
SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	
3. Velocity/Depth Regime	All four velocity/depth regimes presenr (slow-deep slow-shallow, fast-deep: fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 oirhe 4 regimes present (if fast-shallow is missing, score iowcr than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom aifected bv sediment depositibn.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom aifected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old Qndnev bars; 30-50% oirhe bottom affected; sediment deposits at obstructions, consmctions, and bends moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% o i the bottom changing frequently: pools almost absent due to substantial sediment deposition.
SCORE 14	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channcl substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate IS exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream wirh normal pattern.	Some channelization present, usually in areas of bridge abutments; evidcnce of past channelization, i.e., dredging, (greater than pasr 20 yr) may be prcscnr, but recent channelization is nor present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width the stream <7:1 generally 5 to 7); variety of habitat is key. n streams where riffles re continuous, placement of boulders or ther large, natural bstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the widrh of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; disrance between riffles divided by the widrh of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; disrance between riffles divided by the width of the stream is a ratio of >25.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence if erosion or bank ailure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of crosion mostly healed uver. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas oierosion: high crosion potential during tloods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends: obvious bank sloughing: 60-100% of bank has
SCORE 9 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank (10)			
9. Vegetative Protection (score each bank)	More than 90% of rhe srreambank surfaces and immediate riparian zone covered by native vegetation, including trees. understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or nor evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potcnrial to any great exient; more rhan one-half of the potential plant stubble hcighr remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; parches uibare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of rhr streambank surfaces covered by vegetation; disruption of streambank vegetation is very high: vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 9 (LB)	Left Bank 10 9	8 7 6	5 3 3	2 1 0
SCORE 10 (RB)	Right Bank 10 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds. clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Widrh of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human acrivities.
SCORE 10 (LB)	Left Bank 10 9	8 7 6	5 4 3	2 1 0
SCORE 6 (RB)	Right Bank 10 9	8 7 (6)	5	

Total Score 171

STREAM NAME Lask Creek		LOCATION @ 1446	
STATION4 9	RIVERMILE	STREAM CLASS	
LAT	LONG	RIVER BASIN	
STORET #		AGENCY	
INVESTIGATORS WD, JM, OA SW			
FORM COMPLETED BY WP		DATE 5-2-00 AM (PM)	REASON FOR SURVEY

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

photo #5 down

photo #6 up

HABITAT TYPES

Indicate the percentage of each habitat type present

☑ Cobble 45 % ☑ Snags 15 % ☑ Undercut Banks 10 % ☑ Sand 20 %

☐ Submerged Macrophytes ____ % ☐ Other (CPOM) 10 %

STREAM CHARACTERIZATION

Subsystem Classification: ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type: ☐ Coldwater ☑ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☒ Forest ☐ Commercial
☐ Field/Pasture ☒ Industrial
☐ Agricultural ☐ Other _____
☒ Residential

Local Watershed NPS Pollution
☐ No evidence ☐ Some potential sources
☐ Obvious sources

Canopy Cover
☒ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark 2 m

Local Water Erosion
☐ None ☐ Moderate ☒ Heavy

Estimated Stream Width 7 m

Estimated Stream Depth
☒ Riffle .2 m ☒ Run .5 m
☒ Pool .9 m

Velocity 1.3 ft/sec m/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☒ No

Dam Present ☐ Yes ☒ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☐ Trees ☒ Shrubs ☐ Grasses ☒ Herbaceous

dominant species present ragweed, ironweed, sycamore, magnolia

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☒ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☒ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover 70%

SEDIMENT/ SUBSTRATE

Odors
☒ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☒ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other _____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☒ No

WATER QUALITY

Temperature _____ ° C

Specific Conductance _____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☒ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☒ None ☐ Other _____

Turbidity (if not measured)
☒ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")	10	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	75			
Sand	0.06-2mm (gritty)	15	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	<0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAMNAME Clemons Fork	LOCATION nson
STATION$ 10 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASM
STORET#	AGENCY EPA / KyDow
INVESTIGATORS	
FORM COMPLETED BY Howard Iweldo	DATE 5/2/00 TIME 1500 AM PM / REASON FOR SURVEY MTM/VF

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at srage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat: well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat: habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder pamcles are 25-50% surrounded by fine scdimcnt.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder pamcles are more than 75% surrounded by fine sediment.
SCORE	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four veiocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or line sediment: 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends moderate deposition of	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the mailable channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or sharing structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream <7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 (7) 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters; little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank (10) 9	8 7 6	(5) 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 9	8 7 6	(5) 4 3	2 1 0

Parameters to be evaluated broader than stream segment

Total Score 169

STREAM NAME Clemons Fork	LOCATION in Robinson Forest
STATION # 10 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / KyDow
INVESTIGATORS Howard / Wilder / Ewell	
FORM COMPLETED BY Howard / Wilder	DATE 5/24/00 15:00 AM (PM)
	REASON FOR SURVEY MTM / VF

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

Pix 11, 12, 13

HABITAT TYPES

Indicate the percentage of each habitat type present

☑ Cobble____% ☑ Snags____% ☑ Undercut Banks____% ☐ Sand____%

☐ Submerged Macrophytes____% ☑ Other (leaf packs)____%

STREAM

Subsystem Classification
☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type
☐ Coldwater ☑ Warmwater

——S	**Predominant Surrounding Landuse** ☒ Forest ☐ Commercial ☐ Field/Pasture ☐ Industrial ☐ Agricultural ☐ Other_____ ☐ Residential **Local Watershed NPS Pollution** ☒ No evidence ☐ Some potential sources ☐ Obvious sources **Canopy Cover** ☐ Partly open ☐ Partly-shaded ☒ Shaded *High Water Mark* 1.5 m/ft
	Local Water Erosion ☒ None ☐ Moderate ☐ Heavy **Estimated Stream Width** 15-18 m ft **Estimated Stream Depth** ☒ Riffle 10" - 1 m ☐ Run 1 m or ft ☐ Pool 2-3 m ft Velocity 1.25 m/sec ft/sec **Estimated Reach Length** 100 m. **Channelized** ☐ Yes ☒ No **Dam Present** ☐ Yes ☒ No
RIPARIAN VEGETATION (18 meter buffer)	**Indicate the dominant type and record the dominant species present** ☒ Trees ☐ *Shrubs* ☐ Grasses ☐ Herbaceous **dominant species present** _____
AQUATIC VEGETATION N/A	**Indicate the dominant type and record the dominant species present** ☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating ☐ Floating Algae ☐ Attached Algae **dominant species present** _____ *Portion of the reach with vegetative cover* ____ %
SEDIMENT/ SUBSTRATE	**Odors** ☒ Normal ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Anaerobic ☒ None ☐ Other_____ **Oils** ☒ Absent ☐ Slight ☐ Moderate ☐ Profuse **Deposits** ☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand ☐ Relict shells ☐ Other_____ **Looking at stones which are not deeply embedded, are the undersides black in color?** ☐ Yes ☒ No
WATER QUALITY	*Temperature* 15.4 °C **Specific Conductance** 65.8 **Dissolved Oxygen** 9.50 **pH** 7.08 **Turbidity** _____ **WQ Instrument Used** Hydrolab **Water Odors** ☒ Normal/None ☐ Sewage ☐ Petroleum ☐ Chemical ☐ Fishy ☐ Other_____ **Water Surface Oils** ☐ Slick ☐ Sheen ☐ Globs ☐ Flecks ☒ None ☐ Other_____ **Turbidity (if not measured)** ☒ Clear ☐ Slightly turbid ☐ Turbid ☐ Opaque ☐ Water color ☐ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	15
Boulder	> 256 mm (10")	30			
Cobble	64-256 mm (2.5"-10")	40	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	20			
Sand	0.06-2mm (gritty)	10	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

3Y

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Cokes Fork	LOCATION @ Buckhorn Cr. Rd
STATION # 11-R RIVERMILE	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS LD JM, JA, SW	
FORM COMPLETED BY LD	DATE 5-2-00 TIME _____ (AM) PM — REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 17	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE 16	20 19 18 17 (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	and less than 5% of the bottom aifcctcd by sediment deposition.	from gravel, sand or line sedimcnr: 5-30% of the bottom affected; slight deposition in pools.	sediment on old and new bars: 30-50% ofrhe bottom affected; sediment deposits at obsrmctions, consrrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development: more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE 15				
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 17	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Aabimt Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream wirh normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yrj may be present, but recent channelization is nor presenr.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 20	20 19 18 17 16	15 14 13 12 11	0 9 s 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	relatively frequent; ratio f distance between ffles divided by width i the stream <7:1 generally 5 to 7); variety of habitat is key. In streams where riffles are connnuous, placement of boulders or other large, natural obstruction is important.	C nfrequent; distance etween riiflcs divided y the widrh of the tream is between 1 to 5.	)ccasional riffle or end; bottom contours rovide some habitat; istance berween rifles ivided by the widrh of ne stream is between 15 o 25.	Generally all flat water or shallow riiflcs; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stabie; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; nfrequent, small areas of erosion mostly healed over. 5-30% oibank in each has areas oi erosion.	Moderately unstable; 30-60% oibank in reach has areas of erosion; high erosion potential ouring floods.	Jnstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% oibank has erosional scars.
SCORE 9 (LB)	Left Bank 10 (9)	(8) 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	(8) 7		
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represenred: disruption evident bur nor affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious; parches of bare soil or closely cropped vegetation common: less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high; vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 9 (LB)	Left Bank 10 (9)	a 7 6	5 4 3	2. 1 0
SCORE 9 (RB)	Right Bank 10 (9)			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-11 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegerarion due to human acriviries.
SCORE 9 (LB)	Left Bank (10) 9	8 1 6	5 4 3	2 I 0.
SCORE 8 (RB)	Right Bank 10 9	(8) 7		

aramerers to be evaluated ber than sampling reach 4

Total Score 174

STREAM NAME Q K	LOCATION Q Buckhorn Cc. Rd.
STATION # 11-R RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGMCY
INVESTIGATORS LD, JM, TA, SD	
FORM COMPLETED BY A D	DATE 5-2-00 / AM PM — REASON FOR SURVEY

TE LOCATION/MAP	raw a map of the site and indicate the areas sampled Photo # 1 upstream Photo # 2 downstream
HABITAT TYPES	Indicate the percentage of each habitat type present ☑ Cobble 40 % ☑ Snags 15 % ☑ Undercut Banks 10 % ☑ Sand 30 % ☐ Submerged Macrophytes 0 % ☑ Other (CPOM 5 %
STREAM CHARACTERIZATION	Subsystem Classification: ☑ Perennial ☐ Intermittent ☐ Tidal — Stream Type: ☐ Coldwater ☑ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☑ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☐ Other_____
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☑ Some potential sources
☐ Obvious sources

Canopy Cover
☐ Partly open ☑ Partly shaded ☐ Shaded

High Water Mark 1 m

Local Water Erosion
☐ None ☑ Moderate ☐ Heavy

Estimated Stream Width 9 m

Estimated Stream Depth
☑ Riffle .2 m ☑ Run .5 m
☑ Pool .7 m

Velocity 1 ft/sec m/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☑ Trees ☑ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present May Apple, Hemlock, Beech, Cherry, Poplar, Sycamore

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☑ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present grass

Portion of the reach with vegetative cover 3 %

SEDIMENT/ SUBSTRATE

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other_____

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other_____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☑ No

WATER QUALITY

Temperature_____ ° C

Specific Conductance_____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other_____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☑ None ☐ Other_____

Turbidity (if not measured)
☑ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		50	Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")				
Cobble	64-256 mm (2.5"-10")	25	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")				
Sand	0.06-2mm (gritty)	25	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAMNAME	Doable	LOCATION	@ 1501
STATION # 12-R	RIVERMILE	STREAM CLASS	
LAT	LONG	RIVER BASIN	
STORET #		AGENCY	
INVESTIGATORS	LD, JM, JA, RW		
FORM COMPLETED BY	LD	DATE 5-3-00 TIME 1345 AM PM	REASON FOR SURVEY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared For colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sediment.
SCORE	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development: more than 50% ot the bortom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9. 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
Channel Iteration	Channelization or dredging absent or minimal; stream wirh normal pattern.	Some channelization presenr, usually in areas of bridge abutments; evidence of past channelization, i.e., drodging, (greater than past 20 yr) may be present, bur recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
CORE	:0 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
. Frequency of iiffles (or bends)	)ccurrence of riffles elatively frequent; ratio if distance between iffles divided by width)f the stream C7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous. placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequenr; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat: distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
I. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly-healed over. 5-30% oibank in reach has areas of erosion.	Moderately unstable; 30-60% ofbank in reach has areas ot'crosion: high erosion potential during floods.	Unstable: many eroded areas; "raw" areas irequenr along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 9046 of the streambank surfaces and immediate riparian zone covered by native vegetation. including trees, understory shrubs. or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not cvidcnt: almost all plants allowed to grow naturally.	70-90% of the streambank sunaccs covered by native vegetation, bur one class of plants is nor well-represented; disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.-	50-70% of the streambank surfaces covered by vegetation; disruption obviou::: parches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation: disruption of streambank vegetation is very high: vegetation has been rcmovrd to 5 centimeters or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 (9)	8 7 6	5 4 3	3. 1 0
SCORE ___ (RB)	Right Bank 10			
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 merers: human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human acriviries have irnpacred zone only minimally.	Width of riparian zone 6-12 merers: human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank (10) (9)	8 7 6	5 4 3	2 1 0
SCORE ___ (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0

Total Score **IS**

STREAM NAME Big Double	LOCATION @ 1501
STATION # 12-R RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS CA JM JA RW	
FORM COMPLETED BY CD	DATE 5-3-00 AM (PM)

REASON FOR SURVEY

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

Photo # 12 up

Photo # 13 down

HABITAT TYPES

Indicate the percentage of each habitat type present

☑ Cobble 70 % ☑ Snags 15 % ☑ Undercut Banks 5 % ☑ Sand 5 %

☐ Submerged Macrophytes ____ % ☐ Other (CPOM) 5 %

STREAM CHARACTERIZATION

Subsystem Classification: ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type: ☐ Coldwater ☑ Warmwater

PARIAN ZONE/ STREAM FEATURES

edominant Surrounding Landuse
☑ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☐ Other_____
☐ Residential

ocal Watershed NPS Pollution
☐ No evidence ☑ Some potential sources
☐ Obvious sources

anopy Cover
☐ Partly open ☐ Partly-shaded ☐ Shaded

ligh Water Mark 1.5 m

Local Water Erosion
☐ None ☑ Moderate ☐ Heavy

Estimated Stream Width 7 m

Estimated Stream Depth
☐ Riffle .2 m ☐ Run .5 m
☐ Pool 1 m

Velocity 1.2 ft/sec m/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

IPARIAN VEGETATION (8 meter buffer)

Indicate the dominant type and record the dominant species present
☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present Birch, Sycamore

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☑ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover 5 %

E

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other_____

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other_____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☑ No

WATER QUALITY

Temperature_____ ° C

Specific Conductance_____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other_____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☑ None ☐ Other_____

Turbidity (if not measured)
☑ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")	5			
Cobble	64-256 mm (2.5"-10")	50	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	40			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAM NAME Sugar Cr	LOCATION @ Redbird		
STATION # 13-R RIVERMILE	STREAM CLASS		
LAT LONG	RIVER BASM		
STORET # (V), JA JM RLJ	AGENCY		
INVESTIGATORS			
FORM COMPLETED BY LD	DATE 5-3-00 TIME 1120 (AM) PM	REASON FOR SURVEY	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	2010% mix of stable habitat; habitat availability less thin desirable; substrate frequently disturbed or removed.	**Less** than 20% stable habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-**75%** surrounded by fine sediment.	Gravel, cobble, and boulder **particles** are more than **75%** surrounded by fine sediment.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes **present** (*if* fast-shallow or slaw-shallow arc missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE 17	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or tine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends: moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% o i the bottom chmgingfrequenrly: pools almost absent due to substantial sediment deposition.
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of [illegible] banks, minimal amount of channel substrate is exposed.	Water fills >75% of the [illegible] <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel **and** mostly present as standing pools.
SCORE 17	20 19 18 (17) 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration 19	Channelization or dredging absent or minimal; stream wirh normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past **20** yr) may be presenr. bur recent channelization is not present.	Channelization may bc extensive; embankments or shoring structures present on both **banks:** and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement: over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed enrirely.
SCORE	20 (19) 18 17 16	**15** 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends) 19	Occurrence of riffles relatively frequent: ratio of distance beween **riffles** divided by width of the stream <7:1 (generally **5** to **7);** variety of habitat is key. in streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequenr: distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance between riffles dividcd by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles dividcd by the width o i the stream **is** a ratio of >25.
SCORE 19	20 (19) 18 17 16	15 14 13 **12** 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	**Bank** stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas o i erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 **4** 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	**5** 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or nor evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation. bur one **class** of plants is nor well-represented; disruption evident but not affecting full plant growth potential to any great extenr: more than one-half of rhc potential plant stubble height remaining.	50-70% oithc streambank surfaces covered by vegetation; disruption obvious; patches of bare soil or closely cropped vcgctation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation: disruption of streambank vegetation is v e y high: vegetation has been removed to 5 centimeters or **less** in average stubble hcighr.
SCORE __ (LB)	Left Bank (10) 9	8 7 6	**5** a **3**	2 1 0
SCORE 10 (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative **Zone** Width (score each bank riparian zonc)	Width of riparian zone >18 meters; human activities (i.e., **parking** lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters: human activities have impacted zone Only minimally.	Width of riparian zone 6-12 meters; human activities have impacred zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE 19 (LB)	Left Bank (10) 9	8 7 6	5 **4.** 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 **3**	2 L 0

Total Score 181

STREAM NAME Sugar Cr.	LOCATION @ Red Bird	
STATION # 13-R RIVERMILE	STREAM CLASS	
LAT LONG	RIVER BASIN	
STORET #	AGENCY	
INVESTIGATORS LD, JA, JM, RW		
FORM COMPLETED BY LD	DATE 5-3-00 (M) PM	REASON FOR SURVEY

SITE LOCATION/MAP	Draw a map of the site and indicate the areas sampled Photo #7 down Photo #8 up
HABITAT TYPES	Indicate the percentage of each habitat type present ☑ Cobble 65 % ☑ Snags 5 % ☑ Undercut Banks 10 % ☑ Sand 5 % ☐ Submerged Macrophytes ____ % ☐ Other (CPOM) 15 %
STREAM CHARACTERIZATION	Subsystem Classification: ☑ Perennial ☐ Intermittent ☐ Tidal Stream Type: ☐ Coldwater ☑ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☑ Forest ☐ Commercial
☐ Field/Pasture ☑ Industrial
☐ Agricultural ☐ Other _____
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☑ Some potential sources
☐ Obvious sources

Canopy Cover
☑ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark 1 m

Local Water Erosion
☐ None ☑ Moderate ☐ Heavy

Estimated Stream Width 6 m

Estimated Stream Depth
☐ Riffle .2 m ☐ Run .5 m
☐ Pool .75 m

Velocity 1.2 ft/sec m/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present Hemlock, sycamore, ironwood, magnolia

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☑ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover 5 %

SEDIMENT/ SUBSTRATE

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other _____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☑ No

WATER QUALITY

Temperature _____ ° C

Specific Conductance _____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☑ None ☐ Other _____

Turbidity (if not measured)
☑ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock			Detritus	sticks, wood, course plant materials (CPOM)	100
Boulder	> 256 mm (10")	10			
Cobble	64-256 mm (2.5"-10")	50	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	25			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

STREAM NAME Sugar Cr	LOCATION @ Rockford
STATION # 13-R-Dup RIVERMILE	STREAM CLASS
LAT _____ LONG _____	RIVER BASIN
STORET #	AGENCY

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	**Poor**
1. Epifaunal **Substrate/** Available **Cover**	Greater than 70% of substrate favorable for epifaunal colonization and fish cover: mix of snags. submerged logs. undercut banks. cobble or other stable habitat nnd at stage to allow full colonization potential (i.e., logs/snags that are nor **new** fall and not transient).	40-70% mix of stable habitat: well-suited for full colonization potential; adequate habitat for maintenance oipopuiations: presence of additional substrate in rhe form of newfall, but nor yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate irequenrly disturbed or removed.	Less than 20% stabie habitat; lack of habitat is obvious; substrate unstable or lacking.
SCORE 19	20 (19) IS. '17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provider diversity of niche space.	Gravel, cobble. md boulder particles are 25-50% surrounded by tine sediment.	Gravel, cobble. and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble. and boulder panicles are more than 75% surrounded by fine sediment.
SCORE 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present ;if fast-shallow or slow-shallow are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE 16	20 19 18 (17) (16)	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment; 5-30% of the bottom affected; slight deposition in pools.	Moderate deposition of new gravel, sand or tine sediment on old nnd new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends: moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequenrly: pools almost absent due to substantial sediment deposinon
SCORE 15	20 19 18 17 16	(15) 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrare IS exposed.	Water fills 25-75% of the available channel, and/or riffle substrates arc mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE 18	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Parameters to be evaluated broader than sampling reach

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
6. Channel Alteration	Channelization or dredging absent or minimal; stream with normal pattern.	Some channelization present, usually in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) may be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement; over 80% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
SCORE 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
7. Frequency of Riffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided by width of the stream 7:1 (generally 5 to 7); variety of habitat is key. In streams where riffles are continuous, placement of boulders or other large, natural obstruction is important.	Occurrence of riffles infrequent; distance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend; bottom contours provide some habitat; distance between riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles; poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE 19	20 (19) 18 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. Bank Stability (score each bank) Note: determine left or right side by facing downstream.	Banks stable: evidence of erosion or bank failure absent or minimal; little potential for future problems. 5% of bank affected.	Moderately stable; infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable; 30-60% of bank in reach has areas of erosion; high erosion potential during floods.	Unstable; many eroded areas; "raw" areas frequent along straight sections and bends; obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE 9 (LB)	Left Bank 10 (9)	8 7 6	5 4 3	2 1 0
SCORE 9 (RB)	Right Bank 10 (9)	8 7 6	5 4 3	2 1 0
9. Vegetative Protection (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs, or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or not evident; almost all plants allowed to grow naturally.	70-90% of the streambank surfaces covered by native vegetation, but one class of plants is not well-represenred: disruption evident but not affecting full plant growth potential to any great extent; more than one-half of the potential plant stubble height remaining.	50-70% of the streambank surfaces covered by vegetation; disruption obvious: patches of bare soil or closely cropped vegetation common; less than one-half of the potential plant stubble height remaining.	Less than 50% of the streambank surfaces covered by vegetation; disruption of streambank vegetation is very high: vegetation has been removed to 5 centimeters or less in average stubble height.
SCORE 10 (LB)	Left Bank (10) 9	8 7 6	5 4 3	2 1 0
SCORE 10 (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative Zone Width (score each bank riparian zone)	Width of riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	Width of riparian zone 12-18 meters; human activities have impacted zone only minimally.	Width of riparian zone 6-12 meters; human activities have impacted zone a great deal.	Width of riparian zone <6 meters: little or no riparian vegetation due to human activities.
SCORE 8 (LB)	Left Bank 10 9	(8) 7 6	5 4 3	2 1 0
SCORE 8 (RB)	Right Bank 10 9	(8) 7 6	5 4 3	2 1 0

Total Score 179

STREAM NAME Sugar Cr.	LOCATION ① Redbird
STATION # 13-Rdup RIVERMILE	STREAM CUSS
LAT LONG	RIVER BASIN
STORET #	AGENCY
INVESTIGATORS LW, JM, JA-W	
FORM COMPLETED BY LW	DATE 5-3-00 AM PM / REASON FOR SURVEY

TE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

Photo # 10 up

Photo # 11 down

HABITAT TYPES

Indicate the percentage of each habitat type present

☐ Cobble 80 % ☐ Snags 5 % ☐ Undercut Banks 5 % ☑ Sand 5 %

☐ Submerged Macrophytes ____ % ☐ Other (CPOM) 5 %

STREAM CHARACTERIZATION

Subsystem Classification: ☐ Perennial ☐ Intermittent ☐ Tidal

Stream Type: ☐ Coldwater ☐ Warmwater

ES

Predominant Surrounding Landuse
☑ Forest ☐ Commercial
☐ Field/Pasture ☑ Industrial
☐ Agricultural ☐ Other_____
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☑ Some potential sources
☐ Obvious sources

Canopy Cover
☐ Partly open ☐ Partly shaded ☐ Shaded

High Water Mark _____ m

Local Water Erosion
☐ None ☑ Moderate ☐ Heavy

Estimated Stream Width 6 m

Estimated Stream Depth
☐ Riffle .2 m ☐ Run .5 m
☐ Pool .7 m

Velocity 1.2 ft/sec m/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present Hemlock, gum, poplar, sycamore, magnolia

AQUATIC VEGETATION

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☑ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover 5 %

SEDIMENT/ SUBSTRATE

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other_____

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☐ Sand
☐ Relict shells ☐ Other_____

Looking at stones which are not deeply embedded, are the undersides black in color?
☐ Yes ☑ No

WATER QUALITY

Temperature_____ ° C

Specific Conductance_____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other_____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☑ None ☐ Other_____

Turbidity (if not measured)
☑ Clear ☐ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other_____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)			ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)		
Substrate Type	Diameter	% Composition in Sampling Reach	Substrate Type	Characteristic	% Composition in Sampling Area
Bedrock		5	Detritus	sticks, wood, coarse plant materials (CPOM)	100
Boulder	> 256 mm (10")	20			
Cobble	64–256 mm (2.5"-10")	35	Muck-Mud	black, very fine organic (FPOM)	
Gravel	2-64 mm (0.1"-2.5")	35			
Sand	0.06-2mm (gritty)	5	Marl	grey, shell fragments	
Silt	0.004-0.06 mm				
Clay	< 0.004 mm (slick)				

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (FRONT)

STREAM NAME Licks Br	LOCATION @ Cyprus AMAX Rd
STATION # 1d RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / KyDow
INVESTIGATORS Howard / Weldon / Call	
FORM COMPLETED BY Howard et al	DATE 5/4/00 TIME 1005 (AM) PM
REASON FOR SURVEY KY MTN / UF	

Parameters to be evaluated in sampling reach

Habitat Parameter	Condition Category			
	Optimal	Suboptimal	Marginal	Poor
1. Epifaunal Substrate/ Available Cover	Greater than 70% of substrate favorable for epifaunal colonization and fish cover; mix of snags, submerged logs, undercut banks, cobble or other stable habitat and at stage to allow full colonization potential (i.e., logs/snags that are not new fall and not transient).	40-70% mix of stable habitat; well-suited for full colonization potential; adequate habitat for maintenance of populations; presence of additional substrate in the form of newfall, but not yet prepared for colonization (may rate at high end of scale).	20-40% mix of stable habitat; habitat availability less than desirable; substrate frequently disturbed or removed.	Less than 20% stable habitat; lack of habitat is obvious: substrate unstable or lacking.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
2. Embeddedness	Gravel, cobble, and boulder particles are 0-25% surrounded by fine sediment. Layering of cobble provides diversity of niche space.	Gravel, cobble, and boulder particles are 25-50% surrounded by fine sediment.	Gravel, cobble, and boulder particles are 50-75% surrounded by fine sediment.	Gravel, cobble, and boulder particles are more than 75% surrounded by fine sedimenr.
SCORE	20 19 18 17 16	15 14 13 (12) 11	10 9 8 7 6	5 (4) 3 2 1 0
3. Velocity/Depth Regime	All four velocity/depth regimes present (slow-deep, slow-shallow, fast-deep, fast-shallow). (Slow is < 0.3 m/s, deep is > 0.5 m.)	Only 3 of the 4 regimes present (if fast-shallow is missing, score lower than if missing other regimes).	Only 2 of the 4 habitat regimes present (if fast-shallow or are missing, score low).	Dominated by 1 velocity/ depth regime (usually slow-deep).
SCORE	20 19 18 17 16	15 (14) 13 12 11	10 9 8 7 6	5 4 3 2 1 0
4. Sediment Deposition	Little or no enlargement of islands or point bars and less than 5% of the bottom affected by sediment deposition.	Some new increase in bar formation, mostly from gravel, sand or fine sediment: 5-30% of the bottom affected: slight deposition in pools.	Moderate deposition of new gravel, sand or fine sediment on old and new bars; 30-50% of the bottom affected; sediment deposits at obstructions, constrictions, and bends; moderate deposition of pools prevalent.	Heavy deposits of fine material, increased bar development; more than 50% of the bottom changing frequently; pools almost absent due to substantial sediment deposition.
SCORE	20 19 18 17 16	15 14 13 12 11	10 9 8 (7) 6	5 4 3 2 1 0
5. Channel Flow Status	Water reaches base of both lower banks, and minimal amount of channel substrate is exposed.	Water fills >75% of the available channel; or <25% of channel substrate is exposed.	Water fills 25-75% of the available channel, and/or riffle substrates are mostly exposed.	Very little water in channel and mostly present as standing pools.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0

HABITAT ASSESSMENT FIELD DATA SHEET—HIGH GRADIENT STREAMS (BACK)

Habitat Parameter	Condition Category: Optimal	Suboptimal	Marginal	Poor
Channel Iteration	Channelization or dredging absent or minimal: stream with normal pattern.	Some channelization present, **usually** in areas of bridge abutments; evidence of past channelization, i.e., dredging, (greater than past 20 yr) **may** be present, but recent channelization is not present.	Channelization may be extensive; embankments or shoring structures present on both banks; and 40 to 80% of stream reach channelized and disrupted.	Banks shored with gabion or cement over 10% of the stream reach channelized and disrupted. Instream habitat greatly altered or removed entirely.
CORE	20 (19) 18 17 16	15 14 13 12 11	10 9 **8** 7 6	5 4 3 2 1 0
. Frequency **of** iffles (or bends)	Occurrence of riffles relatively frequent; ratio of distance between riffles divided **by** width of the stream <7:1 (generally 5 to 7): variety of habitat **is** key. In streams where riffles are continuous. obstruction is important.	Occurrence of riffles infrequent; disrance between riffles divided by the width of the stream is between 7 to 15.	Occasional riffle or bend: bottom contours provide some habitat; distance berween riffles divided by the width of the stream is between 15 to 25.	Generally all flat water or shallow riffles: poor habitat; distance between riffles divided by the width of the stream is a ratio of >25.
SCORE	20 19 (18) 17 16	15 14 13 12 11	10 9 8 7 6	5 4 3 2 1 0
8. **Bank Stability** (score each bank) Note: determine left or right side **by** ficing downstream.	Banks stable; evidence of erosion or bank failure absent or minimal; little potential for future problems. <5% of bank affected.	Moderately stable: Infrequent, small areas of erosion mostly healed over. 5-30% of bank in reach has areas of erosion.	Moderately unstable: 30-60% of bank in reach has areas of erosion; high erosion potential during **tloods.**	Unstable: many eroded areas; "raw" areas frequent along straight sections and bends: obvious bank sloughing; 60-100% of bank has erosional scars.
SCORE ___ (LB)	Left Bank 10 9	S (7) 6	5 **4** **3**	2 1 0
SCORE ___ (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
9. **Vegetative Protection** (score each bank)	More than 90% of the streambank surfaces and immediate riparian zone covered by native vegetation, including trees, understory shrubs. or nonwoody macrophytes; vegetative disruption through grazing or mowing minimal or nor evident; almost **all** plants allowed to grow naturally.	70-90% of the *streambank surfaces* covered by native vegetation, but cnc class of plants is nor **well-represented**; disruption evident bur nor affecting full plant growth potential to any great extent; more rhan one-half of the potential plant stubble height remaining.	50-70% o i the *streambank surfaces* covered by vegetation; disruption obvious; patches of bare soil or closely cropped vegetation common; less than one-half of the porcnriai plant stubble height remaining.	Less than 50% of the *streambank surfaces* covcrcd by vegetation: disruption of streambank vegetation is very high: vegetarian has been removed to 5 centimcrers or less in average stubble height.
SCORE ___ (LB)	Left Bank 10 9	8 (7) 6	5 4 3	2. 1 0
SCORE ___ (RB)	Right Bank (10) 9	8 7 6	5 4 3	2 1 0
10. Riparian Vegetative **Zone** Width (score each **bank** riparian zone)	Width **of** riparian zone >18 meters; human activities (i.e., parking lots, roadbeds, clear-cuts, lawns, or crops) have not impacted zone.	**Width of** riparian zone 12-18 meters: human activities have impacted zone only minimally.	Width of **riparian** zone 6-12 meters: human activities have impacted **zone** a great deal.	Width **of riparian** zone <6 meters: little or no riparian vegetation due to human activities.
SCORE ___ (LB)	Left Bank 10 9	8 (7) 6	5 4 3	2 , 0.
SCORE ___ (RB)				2 1 0

Total Score _____

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (FRONT)

STREAM NAME Hicks Br	LOCATION @ Cypress Mary Rd
STATION # 14 RIVERMILE	STREAM CLASS
LAT LONG	RIVER BASIN
STORET #	AGENCY EPA / KyDOW
INVESTIGATORS Howard / Weldon / Call	
FORM COMPLETED BY Howard et al	DATE 5/4/00 1000 (AM) PM
REASON FOR SURVEY Ky MTM / UF	

SITE LOCATION/MAP

Draw a map of the site and indicate the areas sampled

Sta 14

PIX # 29 upstream - mid-pt
30 downstream mid-pt

Sta. 14-D (Duplicate Benthos)

PIX # 31 upstream, mid pt
32 downstream, mid pt

HABITAT TYPES

Indicate the percentage of each habitat type present

☑ Cobble ____ % ☐ Snags ____ % ☑ Undercut Banks ____ % ☐ Sand ____ %

☐ Submerged Macrophytes ____ % ☑ Other (Leaf Packs) ____ %

STREAM CHARACTERIZATION

Subsystem Classification ☑ Perennial ☐ Intermittent ☐ Tidal

Stream Type ☐ Coldwater ☑ Warmwater

RIPARIAN ZONE/ INSTREAM FEATURES

Predominant Surrounding Landuse
☑ Forest ☐ Commercial
☐ Field/Pasture ☐ Industrial
☐ Agricultural ☐ Other _____
☐ Residential

Local Watershed NPS Pollution
☐ No evidence ☑ Some potential sources (cadyard)
☐ Obvious sources

Canopy Cover
☐ Partly open ☑ Partly shaded ☐ Shaded

High Water Mark 41' m

Local Watershed Erosion
☑ None ☐ Moderate ☐ Heavy

Estimated Stream Width 12' m

Estimated Stream Depth
☐ Riffle 6-10" m ☐ Run 1' m
☐ Pool _____ m

Velocity 1.67 meter ft/sec

Estimated Reach Length 100 m

Channelized ☐ Yes ☑ No

Dam Present ☐ Yes ☑ No

RIPARIAN VEGETATION (18 meter buffer)

Indicate the dominant type and record the dominant species present
☑ Trees ☐ Shrubs ☐ Grasses ☐ Herbaceous

dominant species present _____

AQUATIC VEGETATION

N/A

Indicate the dominant type and record the dominant species present
☐ Rooted emergent ☐ Rooted submergent ☐ Rooted floating ☐ Free Floating
☐ Floating Algae ☐ Attached Algae

dominant species present _____

Portion of the reach with vegetative cover ____%

SEDIMENT/ SUBSTRATE

Odors
☑ Normal ☐ Sewage ☐ Petroleum
☐ Chemical ☐ Anaerobic ☐ None
☐ Other _____

Oils
☑ Absent ☐ Slight ☐ Moderate ☐ Profuse

Deposits
☐ Sludge ☐ Sawdust ☐ Paper fiber ☑ Sand
☐ Relict shells ☐ Other _____

Looking at stones which are not deeply embedded, are the undersides black in color?
☑ Yes ☐ No

WATER QUALITY

Temperature _____ ° C

Specific Conductance _____

Dissolved Oxygen _____

pH _____

Turbidity _____

WQ Instrument Used _____

Water Odors
☑ Normal/None ☐ Sewage
☐ Petroleum ☐ Chemical
☐ Fishy ☐ Other _____

Water Surface Oils
☐ Slick ☐ Sheen ☐ Globs ☐ Flecks
☑ None ☐ Other _____

Turbidity (if not measured)
☐ Clear ☑ Slightly turbid ☐ Turbid
☐ Opaque ☐ Water color ☐ Other _____

INORGANIC SUBSTRATE COMPONENTS (should add up to 100%)

Substrate Type	Diameter	% Composition in Sampling Reach
Bedrock		
Boulder	> 256 mm (10")	5
Cobble	64-256 mm (2.5"-10")	40
Gravel	2-64 mm (0.1"-2.5")	20 25
Sand	0.06-2mm (gritty)	20
Silt	0.004-0.06 mm	10
Clay	< 0.004 mm (slick)	

ORGANIC SUBSTRATE COMPONENTS (does not necessarily add up to 100%)

Substrate Type	Characteristic	% Composition in Sampling Area
Detritus	sticks, wood, coarse plant materials (CPOM)	10
Muck-Mud	black, very fine organic (FPOM)	
Marl	grey, shell fragments	

PHYSICAL CHARACTERIZATION/WATER QUALITY FIELD DATA SHEET (BACK)